



**IJIRCCCE**

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

**Volume 10, Issue 4, April 2022**

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 8.165**



9940 572 462



6381 907 438



ijircce@gmail.com



www.ijircce.com

# Development of Unmanned Ground Vehicle

Snehal Shirsath<sup>1</sup>, Supriya Sahane<sup>1</sup>, Mr.S.R.Chaudhari<sup>2</sup>

UG Student, Dept. of Mechanical Engineering, SVIT, Nashik, Maharashtra, India<sup>1</sup>

Assistant Professor, Dept. of Mechanical Engineering, SVIT, Nashik, Maharashtra, India<sup>2</sup>

**ABSTRACT:** Generally many risky, unmanageable and various tasks are difficult to handle by human. Thus there is need for something, which can be physically present and handle the task. So, robot can be much effective and useful option for such risky tasks. Nowadays in industries, medical, colleges, home appliance, restaurants, military and defense, robot plays very important role and make the task easier and efficient. The proposed work is to design and develop for military application. There are two general classes of unmanned ground vehicles: **Tele-operated, Autonomous.** A tele-operated, or unmanned ground vehicle that is controlled by a human operator at a remote location via a communications link. Our project “Unmanned ground vehicle” is built to undertake missions like border security, coordination with human soldiers. Our system has a manual mode. This project presents the development of unmanned ground vehicle with cost effective and good quality materials.

## I. INTRODUCTION

Unmanned Ground Vehicles (UGVs) have many potential applications, ranging from military missions such as explosive ordnance disposal (EOD), reconnaissance, surveillance and combat; industrial and home usage, such as harvesting crops and cleaning floors; to special tasks such as rescue operations. UGVs, therefore, have drawn interest from many researchers and organizations, especially the military, since the 1960s, and the demand for them is ever increasing. UGVs were used for inspection at checkpoints in Iraq and Afghanistan and for rescue operations during the World Trade Center disaster.

An unmanned ground vehicle (UGV) is a military robot used to augment the soldier’s capability. This type of robot is generally capable of operating outdoors and over a wide variety of terrain, functioning in place of humans. UGVs have counterparts in aerial warfare (unmanned aerial vehicle) and naval warfare (remotely operated underwater vehicles). Unmanned robotics is actively being developed for both civilian and military use to perform dull, dirty, and dangerous activities. An autonomous UGV is essentially an autonomous UGV that operates without the need for a human controller. The vehicle uses its sensors to develop some limited understanding of the environment, which is then used by control algorithms to determine the next action to take in the context of a human provided mission goal. This fully eliminates the need for any human to watch over the menial tasks that the UGV is completing. Existing systems do not include the environmental information assessment, object identification, self-protection against high temperature and the implementation with most advanced hardware and related software algorithm.

There are two general classes of unmanned ground vehicles:-

1. Tele-operated
2. Autonomous.

### 1. Tele-operated

Autonomous robots still require regular maintenance, as with all machines. A Tele-operated UGV is a vehicle that is controlled by a human operator at a remote location via a communications link. All cognitive processes are provided by the operator based upon sensory feedback from either line-of-sight visual observation or remote sensory input such as videocameras. A basic example of the principles of Tele-operation would be a toy remote control car. Each of the vehicles is unmanned and controlled at a distance via a wired or wireless connection while the user provides all control based upon observed performance of the vehicle.

### 2. Autonomous

An autonomous UGV is essentially an autonomous robot but is specifically a vehicle that operates on the surface of the ground. A fully autonomous robot in the real world has the ability to: Gain information about the environment. Work for extended durations without human intervention. Travel from point A to point B, without human navigation assistance. Avoid situations that are harmful to people, property or itself, unless those are part of its design specifications. Repair itself without outside assistance. Detect objects of interest such as people and vehicles.

## II. BLOCK DIAGRAM AND DISCRIPTION OF UGV

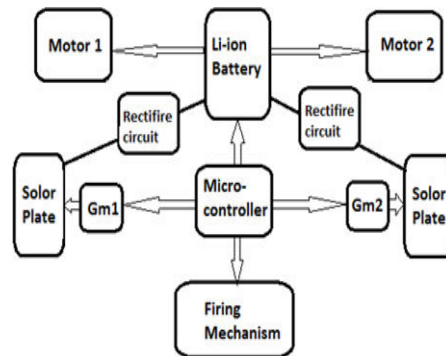


Figure 1 General block diagram

The block diagram consist of battery, wiper motor, gear motor, solar plate, gun, ultrasonic sensor etc.



Figure 2 construction of unmanned ground vehicle

- A solar cell, or photovoltaic cell (previously termed "solar battery"), is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect, which is a physical and chemical phenomenon.

- As we are going to use car Battery the motor used should essentially be a 12V DC motor with sufficient torque to overcome the thread friction and to raise the load.
- A gear motor is a specific type of electrical motor that is designed to produce high torque while maintaining a low horsepower, or low speed, motor output.
- An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back.

### III. WORKING PRINCIPLE

When enemy detected by the intelligence of the military, the control room send the triggering input to the system of robot by using wireless network. This triggering signals received by antenna of robot. When this triggering signal received by robot then it be ready for the firing.

After receiving the command from control room micro controller run the program. As per the given condition micro controller actuate the slider motor by providing supply to the relay of motor for sliding the solar plate by using rack and pinion arrangement powered by motor. After opening the solar plates micro controller trigger the relay of screw jack motor, by using power of motor screw jack moves in upward direction up to certain level.



Figure 3 Firing mechanism

At reaching the certain position micro controller trip the supply of screw jack motor. And actuate the ultrasonic module for enemy detection and position changing motor of gun. The position changing motor rotate the gun in 359 degree in clock wise and anti-clock wise direction. Gun rotate in 359 degree by using motor power the ultrasonic fitted on the gun detects the enemy and send signal to the micro controller. Micro controller compare with the standard data. And take the decision of firing, after that it trigger the motor of gun by using relays. Then gun fire the bullet on enemy. When enemy change his position, the rotation motor rotate the gun for finding the new enemy. After detecting new position rotation motor stop at that position and gun start to fire. At the end of war stop signal send by the control room sense by robot antenna and send signal to controller, then micro controller read the signal and stop the ultrasonic and rotational motor of gun. Then signal send supply reverse supply to the screw jack motor and screw jack goes to the downward initial position. after reaching of screw jack to initial position, microcontroller send command and trip the power of motor and connect reverse supply to the slider motor to close the slider and keep the robot in its initial state.

#### IV. ADVANTAGES

- The biggest and most apparent benefit of UGV is that it is much safer in risky and dangerous situations.
- Provide direct fire support.
- They provide high precision over wide areas day and night.
- Increasing stand of distance.
- Increasing survivability.
- Unmanned UGV are being actively developed for both civilian and military use to perform a variety of dull, dirty, and dangerous activities.
- Predominantly these vehicle are used to replace humans in hazardous situations.

#### V. APPLICATION

- It can used for border security.
- It is also used in desert, glassier and uneven ground surface.
- It is used in high-mountain.
- To undertake dangerous missions which involves loss of human life.
- Used for Ground surveillance operations.
- Used to enhance military raids in urban settings.

#### VI. FUTURE SCOPE

1. We can use the GPS system for better enemy detection.
2. Gun can be replaced by the missile launcher with the help of advanced technique.
3. Increased the sensor range for better enemy detection

#### VII. CONCLUSION

After creating working prototype of Unmanned Ground Vehicle (UGV) achieved our Objectives that we will successfully creating economically cheap robot and making it from good quality material. It is reliable and work in any environmental condition.

We can also minimize the killing of our soldier. There has been significant progress in the canonical areas of perception for UGVs: road following, obstacle detection and avoidance, classification and reversibility analysis.

#### ACKNOWLEDGMENT

We are thankful to our project guides Ms. Sangeeta Kotecha and Ms. Sheetal Gore for their immense support, guide and inspiration throughout our project.

#### REFERENCES

1. Y. Harmon and D.W Gage, "current technical research issues of autonomous robots employed in combat," 17th annual electronics and aerospace conference, 1984.
2. K. L. Su," Automatic Fire Detection System Using Adaptive Fusion Algorithm for Fire Fighting Robot," 2006 IEEE International Conference on Systems, Man and Cybernetics, Taipei,2006, pp. 966-971.
3. Dilipkumar, transport "Wireless multifunctional robot for military applications" 10.1109/RAECS.2015.7453343.
4. S.A. Joshi, AparnaTondarkar, "Surveillance Robot for Military Application" 0.18535/ijecs/v7i5.10.
5. J. Borenstein, A. Borrell, R. Miller, and D. Thomas. Heuristicsenhanced dead-reckoning (HEDR) for accurate position tracking of tele-operated UGVs. In *Proceedings of the SPIE*, volume DS117, Orlando, April 2010
6. [www.mesa-robotics.com](http://www.mesa-robotics.com)
7. [www.irjet.in](http://www.irjet.in)



INNO  SPACE  
SJIF Scientific Journal Impact Factor

Impact Factor: 8.165

 **doi**<sup>®</sup>  
**CROSS** **ref**

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

 9940 572 462  6381 907 438  [ijircce@gmail.com](mailto:ijircce@gmail.com)



[www.ijircce.com](http://www.ijircce.com)

Scan to save the contact details